California Environmental Protection Agency

Air Resources Board

PROPOSED

Vapor Recovery Test Procedure

TP-201.2G

Bend Radius Determination for Underground Storage Tank Vapor Return Piping

Adopted: _____

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Air Resources Board

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Bend Radius Determination for Underground Storage Tank Vapor Return Piping

Definitions common to all certification and test procedures are in:

D-200 Definitions for Vapor Recovery Procedures

For the purpose of this procedure, the term "CARB" refers to the California Air Resources Board, and the term "Executive Officer" refers to the CARB Executive Officer or his or her authorized representative or designate.

1. APPLICABILITY AND PURPOSE

This procedure applies to any gasoline compatible piping that is use as vapor return piping to gasoline storage tanks of dispensing facilities (GDF's). The purpose is to determine whether vapor recovery piping complies with the bend radius performance standard specified in CP-201 and Executive Order. This procedure can be used for certification and compliance test.

2. PRINCIPLE AND SUMMARY OF TEST PROCEDURE

Gasoline vapor return piping utilized in GDF's must be made of a material rigid enough to maintain the proper slope from dispensers and vent stacks to the gasoline storage tanks. Non-rigid piping may not be used for vapor return piping, unless it is contained within rigid piping or an equivalent. Flexible piping is more susceptible to movement, shifting and loss of proper slope with ground settling after backfilling than is rigid piping and without the rigid support; it is not acceptable for use as vapor recovery piping. This test procedure measures the bend radius of a ten-foot length of pipe that is supported at two points and has a weight suspended from the center of the pipe for a given length of time. Rigid piping is defined as not exceeding the bend radius.

3. BIASES AND INTERFERENCES

To avoid thermal effects testing should be performed within +/- 5 degrees of standard temperature (72 degrees Fahrenheit +/- 5 degrees) the temperature range specified for the pipe.

4. SENSITIVITY, RANGE AND PRECISION

Section reserved for future comment if needed.

5. EQUIPMENT

5.1 Roller Stands (2)

5.2 Three (3) foot minimum measuring tape or ruler. (1/8" minimum increments)

5.3 Forty (40) lb. weight +/- 2 oz

5.4 One inch wide strapping material

5.5 Ten foot (10) +/- ¼" length of vapor piping

5.6 Felt tipped marker

6. TEST PROCEDURE

Record all the following measured results on Form 1. Alternate forms may use as long as they contain the same information

6.1 Place roller stands on flat level surface with the rollers aligned parallel with each other and adjust the height of the top of each roller to three feet (3') +/- 1/8" measured from the ground up.

6.2 Measure the distance between the top of each roller and adjust the distance until they are six (6) feet +/- ¼" apart.

6.3 Using the felt tipped marker, mark lengths two (2) ft from each end of the 10 foot pipe length and the center of the pipe, five (5) ft from either end.

6.4 Place the pipe on the roller stands such that the two (2) ft marks are on top of the rollers.

6.5 Measure and record the distance from the bottom of the pipe to the ground at the center of the pipe.

6.6 Suspend the forty pounds (40) at the center of the pipe.

6.7 Wait five (5) minutes and record the distance from the bottom of the pipe center to the ground.

7.1 CALCULATING RESULTS

For two inch diameter piping, a six foot bend radius equates to an approximate deflection of ten inches (10”) measured at the center of an arc chord of two points that are 6 ft apart on a curved pipe length.

7.1 Subtract the measured distance of the weighted pipe center from the ground from the measured distance of the straight pipe length form the ground.

7.2 If this distance is ten inches (10”) or less than the pipe has a bend radius greater than six (6) ft and meets the rigidity requirement for vapor piping.

8 REPORTING RESULTS

Report results on Form 1.

9 ALTERNATE PROCEDURE

This procedure shall be conducted as specified. Modifications to this procedure shall not be used to determine compliance unless prior written approval has been obtained from the Executive Officer, pursuant to Section 14 of Certification Procedure CP-201.

TP-201.2G Form 1

Pipe Specifications	
Pipe Manufacturer	
Piping Material (FRP, HDPE, etc)	
Outside Pipe Diameter (inches)	

Section 6 Test Measurements:	
6.2 Distance from top of roller stands to ground (inches)	
6.3 Horizontal distance between centerline of each roller stand (inches)	
6.4 Distance from bottom of unladed pipe center to ground (inches)	
6.5 Distance from bottom of weighted pipe length center to ground after 5 minutes (inches)	
Section 7 Calculations	
7.1 Difference between measurements obtained from Measurement 6.4 and Measurement 6.5 (inches)	
7.2 Is the measurement less than or equal to ten inches (10") ? (Yes or No)	
If the answer to 7.2 is yes, then the minimum bend radius for the pipe is six feet or greater and the piping meets the minimum bend radius requirements.	

TP-201.2G Figure 1